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ABSTRACT

The positive correlation between higher educational attainment and lower unemployment is as strong for females as for males. However, analysis of statistical data on female workers drawn from the National Longitudinal Samples (NLS), and comparison with the findings of an earlier study on the relationship between educational attainment and unemployment for males, point to the following sex differences: (1) educational differences in on-the-job training are related to low turnover among men; (2) educational differences in labor force attachment are related to low turnover among women; (3) educational differences in the duration of unemployment are negligible among females; and (4) educational differences in the duration of unemployment among males are small but observable. Recent growth in women's work attachment has reduced their inter-labor force turnover and their unemployment rate to the point of eliminating the sex differential. On-the-job training of women appears to have increased but it still remains skimpy. Statistical data on 13 tables are included. A list of 12 references and statistical data on five tables are appended. (FMW)

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National Center for Education and Employment
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EDUCATION AND UNEMPLOYMENT OF WOMEN

Jacob Mincer
Columbia University

Technical Paper No. 10

January 1990

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PREFACE

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Abstract

The more education, the less unemployment of women; this relationship is as strong as it is in the male labor force. The channel through which this relation arises is also the same, namely, labor turnover, almost half of which involves unemployment. However, the relation between education and turnover is mediated largely by educational differences in on-the-job training among men, while educational differences in labor force attachment are the main source of turnover differences among women. This is because levels of educational differences in on-the-job (in-house) training are small among women, while nonparticipation in the labor market and educational differences in it are quite small among men. Educational differences in the duration of unemployment are negligible among women, though they are observable, if small, among men.

Recent growth in women's work attachment has reduced their inter-labor force turnover and their unemployment rate to the point of eliminating the sex differential. On-the-job training of women appears to have increased, though it still remains skimpy.

EDUCATION AND UNEMPLOYMENT OF WOMEN

Introduction

In a previous NCEE Report (1987), I analyzed the effects of education of male workers on their unemployment experience. The Panel Study of Income Dynamic (PSID) panel data covering years from 1968 to 1982 confirmed the well-known finding of a negative relation between education and unemployment. A major explanation of the education effect on unemployment was that the more educated workers change employers less frequently than other workers. In turn, their stronger attachment to the firm is, in large measure, attributable to their more intensive learning and training on the job. The positive correlation of education and training is a reflection of greater learning abilities, opportunities, and preferences of the more educated persons. And the negative correlation between training and turnover reflects the fact that to some extent skills acquired by training are firm-specific, that is, not fully transferable to other firms.

The major reason for analyzing men separately from women lies in sex differences in labor force attachment (participation).[1] In contrast to men whose labor force participation rate (LFPR) is 90 to 100 percent after completion of schooling, labor force attachment of women still varies a great deal over the life-cycle. And despite the rapid growth of their LFPR, it is still not much more than 60 percent for married women in an average year. Again, it is well known that women's attachment to the labor market -- whether measured by LFPR or by the fraction of the working life spent in the labor market -- is positively related to education. The stronger labor market attachment may be viewed as a consequence of education, since the investment in education pays off more in earnings the more time the worker spends in the labor market. Since inter-labor force turnover (labor force exits and reentries) is necessarily smaller among women whose labor market attachment is stronger, the effects of education on unemployment due to lesser turnover may be negative for women as they were for men, but the causal channels are clearly different. Men's turnover is almost entirely within the labor market and is strongly affected by on-the-job training. The following questions concerning women are

[1] This conclusion was also reached in the pioneering work of the late Beth Niemi in the early 1970's. Her analysis utilized aggregate and sectoral time series data. For references, see Niemi (1974 and 1975). More recently, Janet Johnson (1983) reached a similar conclusion. Her argument is that unemployment of women is overstated, as their on the job search is termed unemployment, when they are fully occupied in the nonmarket.

therefore of interest: (1) How important is inter-labor force turnover, as distinguished from intra-labor force turnover, in affecting unemployment? and (2) What is the role of training in the turnover and unemployment of women?

In order to study women workers it was necessary to shift from the PSID, where information on women is less detailed, to the NLS (National Longitudinal Samples). This data set covers two cohorts of women: (1) young women who were 14 to 24 years old in 1968, and (2) mature women who were 30 to 44 years old in 1967. Random samples of several thousand women in these two cohorts were followed up intermittently over a period of sixteen years. This analysis uses information from interviews conducted at one-year intervals in order to keep the frame of reference between interviews consistent.[2] About half the interviews were conducted at two-year intervals. These were excluded here in order to avoid non-comparabilities.[3] We restricted our data to women who are not students and who worked in the labor market for some time during the years we observed. Only a very small proportion of the women (less than 5 percent) reported no work activity over the sixteen-year period.

Education and Labor Force Attachment

It is a well established finding of economic research that better-educated women tend to be more strongly attached to the labor force than less-educated women. This behavior is explained by human capital theory: The gain from investment in human capital (education and training) increases as the payoff period is lengthened. Consequently, more educated women stay in the labor force over a longer and more continuous working life and acquire more training than do less-educated women. Their labor force turnover (especially between market and nonmarket) is smaller. Table 1 shows the labor force participation rates (proportion of women who worked or searched for work in the survey year) for younger and older women for four levels of education by age in the NLS. The table also shows the proportion of working women who move in and out of the labor force during an average year.

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[2] For younger women, the one-year surveys were in 1969 to 1973, 1978, and 1983. For older women: 1968 to 1972, 1981, and 1982.

[3] Although all magnitudes are necessarily larger in two-year intervals, educational patterns of labor force participation, of turnover rates, and of unemployment are quite similar. Compare Appendix Table A4 with text Table 5A, as an illustration.

TABLE 1

(A) Labor Force Participation Rates (percent)												(B) Inter-Labor Force Turnover Rates (percent)	
NLS Young Women						NLS Mature Women						NLS Young Women	NLS Mature Women
Age Education	16-19	20-24	25-29	30-34	35+	30-34	35-39	40-44	45-49	50-54	55+	All Ages	
<12 yrs.	66.2	61.2	63.1	61.5	58.7	61.8	67.0	66.7	64.0	55.9	46.8	43.9	26.7
12 yrs.	86.2	74.9	65.1	67.4	71.2	57.8	65.3	68.5	73.1	70.0	57.5	27.6	18.9
13-15 yrs.	93.8	81.6	67.7	71.0	72.6	54.1	63.7	71.5	68.7	68.9	70.3	21.3	19.5
16+ yrs.	---	88.7	77.3	71.0	73.8	71.5	74.3	76.7	83.1	75.4	75.8	14.5	12.8

Definitions: The labor force participation rate is the ratio of labor force participants to the population in the age group some time during the year preceding the survey.

Turnover is the ratio of the annual frequency of labor force exits, entries, and reentries to the labor force during the year. This ratio is P(Se) in Table 3A.

NLS young women are the women who were 14 to 24 years old in 1968.

NLS mature women are the women who were 30 to 44 years old in 1967.

Despite the substantial growth in the women's labor force and some growth in continuity of work, large proportions of women still work intermittently over their life-cycle and even within the year. This interrupted working does, of course, reflect the varying (across time and across women) allocations of time and energy between the market and the household (family) for which most women continue to bear major responsibilities.

This factor of time allocation or discontinuous labor force participation distinguishes the analysis of women's behavior from that of men regarding training and labor mobility. We can view the education and training decisions of men as positively dependent on their ability (hence expected returns) and negatively on costs. In addition, the more educated men, who also get more training, change jobs less frequently, since firm-specific training is likely to increase with the total volume of training, which is substantial. For women, however, decisions about human capital investments depend not only on ability and cost, but also on the prospective and actual allocation of time between market and nonmarket activities. This proposition is especially relevant to job training: School education may be expected to confer benefits both to women workers and nonworkers; job training investments pay off only in the labor market. Indeed, one may view the lifetime women's allocation of market/nonmarket activities more as an effect than a cause of educational decisions made early in life. Their training, in the other hand, more closely depends on actual and prospective work attachment, though it is facilitated by educational background.

Given, on average, a shorter and interrupted working life, women are less likely than men to invest in market-oriented betterment, both in terms of a lesser market focus of school education and in lesser job training. As we also observe (below) women invest a much lesser fraction of their training in firm-specific skills. There are two reasons: (1) When work in the labor market is interrupted by family demands, the probability of returning to the same employer is smaller than the probability of returning to the labor market, even when the interruption is relatively short. (2) Even when no interruptions occur in labor market activities, some of women's job changes are induced by family demographic events, geographic and residential mobility, and other family exigencies.

As shown in Table 1, inter-labor force turnover is inversely related to education, a result mainly of stronger labor force attachment of the more educated. However, the relation between

intra-labor force turnover (job changing), especially quits, and education is likely to be attenuated, because of weaker firm-specificity of women's training, and because of household demands.

Education and Training

Women engage in less training on the job than men do. Lillard and Tan (1986) found that women who worked continuously over a 12-year period reported half as much company training as comparable men did. And of those who worked intermittently, a much smaller proportion reported in-house training. However, women tend to receive more training than men from sources outside the place of work, such as business, technical, and vocational schools.

Table 2A shows the proportion of women workers in each of the NLS cohorts who received company training (in-house) and training outside of the work place. These are reported over the survey year (*JTin* for company training, *JTout* for outside training), and since the start of employment in the current firm (*EJTin*, *EJTout*). It is clear that women workers tend to take most of their training from outside sources. Such training serves occupational purposes that are not usually specialized to a particular firm. In-house training which is more likely to be firm-specific is received by few women, especially in the older cohort. Table 2A also shows that the incidence of both kinds of training increases with education. This positive correlation of training with education reflects the greater learning ability as well as the greater commitment to the labor market of the more educated women workers. The positive relation between education and training, which may also reflect complementarity between the two learning activities, appears to be stronger among men and in the younger women's cohort.

Table 2A represents gross (unadjusted) differences in training among women with different levels of education. In Table 2B these differences are standardized for various characteristics of women workers, in addition to education, so that the coefficients shown in Table 2B represent "net effects" of education. They measure the increase or decrease in the frequency of training observed in otherwise similar women whose education is increased by one year. Although both the adjusted (2B) and unadjusted (2A) data show positive correlations of training with education, the adjusted estimate of this relation in the form of regression coefficients shown in 2B indicates some interesting differences: For the young women, *the net effects of education* on in-house training are positive and are stronger the longer the period over which such training is observed. In contrast, in-house training

TABLE 2A
Proportion of Women Workers Receiving Training
within a Year, by Education

Variable	Variable Description	Young Women				Mature Women			
		<12th grade	12th grade	13-15 yrs.	16+ yrs.	<12th grade	12th grade	13-15 yrs.	16+ yrs.
JTIN	Had company training in past year	.01	.04	.05	.03	.01	.01	.02	.01
JTOUT	Had outside training in past year	.11	.13	.18	.23	.05	.08	.16	.22
EJTIN	Had company training in current job	.03	.06	.08	.05	.02	.03	.06	.04
EJTOUT	Had outside training in current job	.14	.19	.25	.35	.09	.15	.26	.39

TABLE 2B
Education Coefficients
in Training Regressions

Training:	JTIN		JJTOUT		EJTIN		EJTOUT	
Young Women	b	t	b	t	b	t	b	t
Educ	.012	(2.9)	-.023	(2.9)	.022	(4.2)	-.036	(4.0)
$Educ^2$	-.0004	(2.2)	.0013	(2.1)	-.0007	(3.3)	.002	(5.7)
Mature Women								
Ed	n.s.		-.008	(1.0)	n.s.		-.033	(4.5)
Ed^2			.0011	(3.3)			.0027	(8.4)

Definitions: n.s. = not significant
b = regression coefficient
t = t-statistic

is not significantly related to education of the older cohort. However, outside training increases with education (starting at the 9 to 11 year school level) in both cohorts. Other characteristics included in the regression but not shown in Table 2B are: marital status, health, number of children, unemployment rates, size of labor market, potential experience (years since completion of schooling), service industry employment, and union membership. The full regression is shown in the Appendix Table A1.

In the full regression, it appears that the incidence of in-house training is smaller among married women, black women, and women who have more children, and is greater in larger labor markets and in service industries. Training frequency increases in the first decade after completion of schooling and declines thereafter, is smaller the longer women stay out of the labor market, and larger the longer their uninterrupted employment (not shown here). All these effects do not appear to be significant for the older cohort, partly because much less training is received by them and partly because the sample is smaller.

As for outside training, it is similarly less frequent among married women and black women, and it declines with age in the younger cohort. However, it is greater among employees in service industries and in periods of high unemployment when trainee opportunity costs are low.

Of special interest are the differences between the two cohorts: The decline in training as workers age is a predictable finding according to human capital theory because aging implies a shortening of the payoff period, making investments in training less profitable. The decline is clearly observed among men in a number of studies. The age pattern for women is less predictable in view of the interruptions which are more frequent and longer during the first one or two decades after leaving school. The lesser training received by the older cohort of women, compared to the younger cohort, as seen in Table 2A, reflects more than an age effect: Table 2C shows the incidence of training for each cohort at the same age (30 to 39). Rather clearly, the younger cohort acquired more training (especially in-house) than the older one, at the same age. That age was reached by the younger cohort almost a decade after it was reached by the older cohort. Increasing labor force attachment of women over this period, especially in the younger cohort, has been documented in a

number of studies.[4] It is also visible in Table 1 in the columns showing the turnover rates. The stronger work commitment in the recent cohorts increases training incentives of workers and employers. This is especially true of in-house training which is more likely to be firm specific. Table 2C clearly confirms this hypothesis, though the incidence of women's on-the-job training still remains quite small among young women compared to young men.

We proceed now to women's turnover, measured by separation rates, distinguishing between intra- and inter-labor force turnover.

Separations

Table 3A classifies separation rates P(s) into intra-labor force movements between firms while in the labor market P(Sa) and inter-labor force P(Se) moves in and out of the labor force. In the latter, entry is preceded and exit is followed by nonparticipation. Both intra- and inter-labor force moves are expressed as ratios to the labor force during the survey year. Multiple moves within the year are counted as one, since they are not reported. Of course, P(s) = P(Sa) + P(Se).

It is clear in these figures (column a) that education reduces turnover P(s) mainly because it reduces inter-labor force mobility P(Se). Within the labor market education has a weak or no apparent effect on labor mobility. (This stands in sharp contrast to the negative effect observed among men.) Inter-labor force mobility P(Se) is more frequent than job changing within the market P(Sa) at education levels of high school and below, and becomes somewhat less frequent than job mobility at higher levels especially for the young women. The table also shows that younger women move more frequently than older women within the market and between market and household.

This finding is reversed in inter-labor force turnover, and the differences in intra-labor force turnover disappear, when the two cohorts are observed at the same age (column b in Table 3A). Trends in labor force attachment are clearly responsible for these findings. The growth in job training in the younger cohort is consistent with these developments. However, the absence of a trend in intra-labor force turnover suggests that growth in women's job training is mainly a result rather than a

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[4] See Shapiro and Shaw (1983), O'Neill (1985), Smith and Ward (1985), Donohue (1987), Hill and O'Neill (1989).

TABLE 2C

Proportions of Women Workers Aged 30 to 39, Receiving Training, by Education

	Young Women				Mature Women			
	<12th grade	12th grade	13-15 years	16+ years	<12th grade	12th grade	13-15 years	16+ years
JTIN	.01	.02	.03	.12	.01	.02	.02	.02
JTOUT	.06	.13	.19	.22	.07	.11	.23	.29
EJTIN	.04	.08	.12	.07	.01	.03	.03	.02
EJTOUT	.13	.25	.36	.46	.09	.13	.25	.31

cause of reduced inter-labor force turnover.

The separation rates shown in Table 3A are not standardized for other worker characteristics, thus showing the gross effects of education. To observe the net effects of education and of training, separation rates in the NLS data pooled over all the survey periods are regressed on working age (years since completion of schooling), marital status, race, health, number of children, local and national unemployment, industry (service or not), and union membership. The coefficients of education and of training in these regressions are shown in Table 3B. (Full regression is shown in Appendix Table A2).

TABLE 3A

Probability of Separation by Education

	All-Turnover		Intra-Turnover		Inter-Turnover	
	P(s)		P(Sa)		P(Se)	
NLS Young Women	(a)	(b)	(a)	(b)	(a)	(b)
Education: <12 Yrs.	.671	.458	.232	.167	.439	.291
12 Yrs.	.500	.338	.224	.146	.276	.192
13-15 Yrs.	.465	.333	.253	.177	.213	.156
16+ Yrs.	.362	.267	.217	.150	.145	.117
NLS Mature Women						
Education: <12 Yrs.	.440	.496	.173	.180	.267	.315
12 Yrs.	.316	.381	.128	.129	.189	.252
13-15 Yrs.	.332	.361	.137	.137	.195	.224
16+ Yrs.	.256	.292	.128	.119	.128	.174

Definitions:
(a) = All ages
(b) = Ages 30 to 39
P(s) = separation rates
P(sa) = labor force moves between firms
P(se) = labor force moves in and out of the labor force

TABLE 3B
Net Effects of Education and of Training on Separations;
Total Separations, P(s), in Survey Year

	Young Women			Older Women		
	Mean	b	t	Mean	b	t
Educ	12.4	-.058	(5.3)	11.9	-.038	(3.7)
$Educ^2$		.001	(1.3)		0	0
JTin	.05	-.104	(4.4)	.02	-.121	(1.7)
JTout	.19	n.s.		.17	-.042	(1.7)
EJTin	.09	-.136	(7.5)	.07	-.132	(4.0)
EJTout	.23	-.041	(4.2)	.32	-.066	(3.8)

TABLE 3C
Intra- and Inter-Labor Force Turnover

	P(Sa)				P(Se)			
	Younger		Older		Younger		Older	
	b	t	b	t	b	t	b	t
Educ	n.s.		n.s.		-.069	(6.8)	-.022	(2.5)
$Educ^2$	n.s.		n.s.		-.001	(2.8)	0	
JTin	n.s.		n.s.		-.115	(5.2)	-.130	(2.1)
JTout	n.s.		n.s.		n.s.		-.052	(2.5)
EJTin	-.028	(1.7)	-.068	(2.8)	-.108	(6.4)	-.065	(2.2)
EJTout	-.034	(3.6)	n.s.		n.s.		-.053	(3.6)
Mean of Separations	.26		.16		.26		.21	

Notes: 1. Other variables in the regression include: age, marital status, race, health, number of dependents, local and national unemployment, size of local market, service industry employment, union membership.
2. The training variables are defined in Table 2A. They are used alternatively in the regressions.

The major findings in 3B confirm those in 3A: Total separation rates decline quite strongly as education level rises in both cohorts of women. It is clear, however, looking at Table 3C, that this decline is due to the decline of inter-labor force mobility P(Se) which reflects the increase in labor force attachment. Intra-labor force mobility (job change) P(Sa) appears to be unaffected by education.

In-house training received during the previous year or any time during firm tenure reduces separations (Table 3B). Training received elsewhere is also negatively related to turnover, but the effect is much smaller. Once again, when separations are distinguished between intra- and inter-labor force moves, it appears that it is the labor force entries and exits that are most strongly affected by training especially by in-house training (Table 3C).

In-house training also reduces intra-labor force moves somewhat, but outside training which is weakly related to moves has no effect on intra-labor force job changes. These findings are consistent with the view that outside training is basically general (transferable to other firms) hence has no effect on firm separations as such. Its weak effect on labor force mobility reflects rather than determines a greater attachment to the labor force, and especially of more educated women.

Do the findings on the effects of two kinds of training on two classes of turnover, in Table 3, shed any light on the relation between education and turnover? This relation appears to hold only in inter-labor force moves. The effects of education on labor force attachment are sufficient to explain this finding.

The positive relation between education and training enhances the negative relation between education and inter-labor force mobility, but greater training received by the more educated women appears to be a consequence rather than a cause of lesser mobility. This is especially true of the larger part of training, namely of outside training which is not likely to contain any firm specificity. While in-house training does reduce mobility, it is not at all related to education of the older women. It is positively correlated with education of younger women (as shown in Table 2B) yet the effect on the relation between education and job change (within the market) is barely visible (Table 3B).
One reason why a positive correlation between education and in-house training does not translate into a negative relation between education and job turnover is that the amount of in-house training of women is relatively small. Another reason is shown in Table 4, which distinguishes quits from layoffs

in job separations, and shows the effects of education on each. It is clear that education has little, if any, effect on quits, despite the somewhat greater in-house training of the younger educated women.[5] Apparently quits of women workers are strongly motivated by family demands including the need for flexible time schedules, residential changes, and husbands' job mobility (Mincer, 1978). Layoffs, whose timing is not subject to these considerations, are affected by education, reflecting employer demand for human capital and some employer investment in training of women whose work commitment is stronger.

However, the bulk of job mobility of women is due to quits, as shown in Table 4. The ratio of quits to layoffs among women, especially younger women, is over 2 to 1 among older women and higher among younger women, while it is closer to equality among men (Mincer, 1987). The high ratio of quits to layoffs reflects not only the importance of family demands on women's allocation of time, but also their greater representation in industries (such as service industries) in which layoffs are less frequent.

We may conclude that human capital acquired by women at school and while at work affects their turnover largely because it affects their inter-labor force turnover and to a lesser extent because it reduces the risk of layoffs.

The asymmetric effect of education on quits and layoffs is also of some importance in understanding the relation between education and the incidence of unemployment.

Education and Unemployment

Table 5A shows the (unadjusted) incidence of unemployment P(u) in an average survey year, in column 1 of each panel. The second and third right-hand panels list the incidence occurring in intra-labor force moves P(ua) and inter-labor force moves P(ue). Women's incidence of unemployment declines with education as sharply as it does among men (Mincer, 1987, Table 1). The differences and reasons for them emerge quite clearly from the identity $P(u) = P(s)\cdot P(u/s)$, when these

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[5] According to Meitzen (1986), the quit rate of newly hired women does not decline over the first two years of tenure, as it does for men. Apparently, matching and training processes, if any, are swamped by exogenous (family) factors.

components are viewed separately in the context of intra- and inter-labor force mobility. P(u/s) is the (conditional) probability of unemployment, given a separation.

TABLE 4

Probability of Layoff P(L) and of Quit P(Q) in Job Separations

	Young Women			Older Women		
Educ	P(L)	P(Q)	L/Q	P(L)	P(Q)	L/Q
<12	.106	.166	.64	.084	.140	.60
12	.073	.206	.35	.078	.150	.52
13-15	.061	.184	.37	.052	.122	.43
16+	.050	.141	.36	.038	.124	.23

Notes: 1. These are joint probabilities, not conditioned on job separations.

2. Here job separations do not include labor force entries or reentries, which are included in Table 3. Although the sum of L and Q is of the same order of magnitude as Sa, data errors in identifying L and Q create discrepancies.

TABLE 5A

Unemployment Incidence P(u) and Its Components

	All Turnover			Intra-Turnover			Inter-Turnover		
	P(u)	P(s)	P(u/s)	P(Ua)	P(Sa)	P(U/Sa)	P(Ue)	P(Se)	P(U/Se)
NLS Young Women									
Education: <12 Yrs.	.302	.671	.450	.123	.232	.531	.179	.439	.408
12 Yrs.	.198	.500	.395	.110	.224	.492	.087	.276	.316
13-15 Yrs.	.162	.465	.349	.104	.253	.410	.059	.213	.276
16+ Yrs.	.107	.362	.296	.080	.217	.369	.027	.145	.186
NBL Mature Women									
Education: <12 Yrs.	.127	.440	.288	.063	.173	.362	.064	.267	.239
12 Yrs.	.071	.316	.224	.040	.128	.307	.031	.189	.166
13-15 Yrs.	.067	.332	.203	.033	.137	.240	.035	.195	.177
16+ Yrs.	.030	.256	.116	.020	.128	.157	.010	.128	.075

TABLE 5B

Net Effects of Education and Training on Unemployment Incidence

	P(u) - Incidence			
	Younger		Older	
	b	t	b	t
Educ	-.033	(3.5)	0	
Educ²	0		-.001	(2.1)
JTin	-.030	(1.6)	n.s.	
JTout	+.016	(1.5)	n.s.	
EJTin	-.046	(3.0)	-.045	(2.1)
EJTout	n.s.		n.s.	
Mean	.13		.09	

Although intra- separations P(Sa) are unrelated to education, the probability of experiencing unemployment conditional on a job change P(u/Sa) declines quite steeply. This is because layoffs decline while quits do not as was indicated in the previous section. In the inter-labor force context both separations and conditional unemployment decline, the latter also a result of quit/layoff behavior. Consequently, the decline in unemployment incidence by education is about twice as steep in the inter-labor force context than in intra-, in both cohorts of women.

The net relation of unemployment incidence to education is shown in the left panel of Table 5B. (Full regression in Appendix Table A3). On average, incidence declines about 3 percent per year of education of young women, and about 2 percent for older women. Table 5B also shows that in-firm training reduces the incidence of unemployment as well. As already stated, this is because training reduces layoffs as well as labor force exits. Outside training is not a significant factor in unemployment incidence.

Finally, to understand the relation between education and unemployment *rates* we must take into account durations of unemployment spells. As was shown in the report dealing with the male labor force, the unemployment rate (u) is basically a product of the incidence of unemployment and of its duration, d(u).

$$u = P(u) \cdot d(u) \cdot 1/d(1)$$

The additional factor d(1) is the fraction of year spent in the labor force. This factor d(1) is close to unity for men, and its variation by education can be ignored. It is more important in analyzing women's unemployment as it reflects differences in labor force participation. The rationale for the term 1/d(1) is that with the same incidence (given duration) of unemployment, persons who spend fewer weeks in the labor force during the year have a higher unemployment rate per week in the labor force.

Table 6 shows the patterns of duration of unemployment by education. Panel A, unstandardized, shows a very small decline as education rises for younger women, and practically no change for older women. The regression adjusted pattern in Panel B shows, if anything, small increases of duration. Not surprisingly, job training has no effect on women's unemployment duration.

TABLE 6

A. Duration of Unemployment (Number of Weeks Unemployed Between Interviews)

Education	NLS Young Women			NLS Mature Women		
	All Separ.	Intra-LF	Inter-LF	All Separ.	Intra-LF	Inter-LF
<12 Yrs.	9.8	10.1	9.6	13.1	12.8	13.4
12 Yrs.	9.8	9.8	9.8	12.3	11.9	12.9
13-15 Yrs.	7.9	7.0	9.3	12.8	13.0	12.6
16+ Yrs.	9.2	9.0	10.0	11.5	12.7	9.1

Definition: LF = labor force

B. Net Effects of Education and Training on the Duration of Unemployment

	D(u) - Duration			
	Younger		Older	
	b	t	b	t
Educ	.83	(1.6)	1.19	(1.2)
$Educ^2$	-.03	(1.4)	-.04	(0.9)
JTIN	n.s.		n.s.	
JTOUT	n.s.		n.s.	
EJTIN	n.s.		n.s.	
EJTOUT	n.s.		n.s.	
Mean				

C. Average Number of Weeks Spent in the Labor Force (WKSLF)
Since the Last Interview
(1-Year Interval)

Education Level	NLS Young Women			NLS Mature Women		
	d(u)	WKSLF	du/d(1)	d(u)	WKSLF	du/d(1)
<12 Yrs.	9.8	36.12	.244	13.1	44.82	.29
12 Yrs.	9.8	42.68	.230	12.3	47.19	.26
13-15 Yrs.	7.9	44.83	.178	12.8	48.58	.26
16+ Yrs.	9.2	46.10	.200	11.5	47.8	.24

Definitions: d(1) = Weeks in labor force
d(u) = duration of unemployment

Why is duration of unemployment not shorter for the more educated women, as is true of men? The answer lies in the differences in labor force attachment: Labor force withdrawal which is more common among less educated women cuts their duration of unemployment to a greater extent than it does for the more educated women. The rough constancy of duration by education of women still yields a declining d(u)/d(1) of about the same magnitude as for men: For men d(1) was roughly constant, but d(u) declined 15 to 20 percent from lowest to highest education level. For women a similar decline in the ratio d(u)/d(1) is due to the increase in d(1) while d(u) is almost constant. Changes in d(1) and in the d(u)/d(1) ratio related to education are shown in Table 6, panel C.

Men and women equally lessen risks of unemployment, with more education. This is true of the incidence of unemployment and of unemployment rates, despite the fact that women's in-house job training is small and largely unrelated to their turnover, especially to quit behavior. The major channel for the educational differences in the unemployment of women is the effect of education on labor force attachment. As both education (at college and higher levels) and labor force rates have accelerated in the recent decade, women's unemployment rates, which previously exceeded men's rates, have fallen relative to the unemployment of men. Vanishing of the sex differential is observable in the 1980's.[6] Indeed, a reversal in the sex differential in unemployment is likely, if labor force attachment of women continues to grow, and if their industrial distribution remains largely unchanged.

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[6] BLS data in *Employment and Earnings* show that about 40 percent of unemployment of women is due to entries and reentries into the labor force. When this component is eliminated (or equalized), women's unemployment was no greater than men's before the 1980's, and smaller in the 1980's. Including the labor force component, total unemployment was higher for women than for men before and about equal during the 1980's.

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APPENDIX TABLES

TABLE A
Regression Variables

Variable	Young Women Mean	Mature Women Mean	Definition
EJTIN	.06	.03	=1 if had company-sponsored training on the current job
EJTOUT	.20	.16	=1 if had outside training on the job
SEP	.52	.37	=1 if changed employers, moved from employment to unemployment, or it entered/left the labor force between two consecutive interviews
ITRA	.23	.14	=1 if changed employers or moved from employment into unemployment between two consecutive interviews
ITER	.29	.23	=1 if entered/left the labor force between two consecutive interviews
UN	.22	.11	=1 if experienced unemployment between two consecutive interviews
TIME	4.70	5.13	number of years since the initial interview
EDUC	12.05	11.48	years of education
MARSP	.55	.70	=1 if currently married with spouse present
RACE	.69	.72	=0 if black, =1 if white
HLTH	.06	.15	=1 if any health limitation or disability
DEP	.98	2.29	number of dependents
URATE	5.78	5.95	local unemployment rate (percentage)
NURATE	5.78	5.57	national unemployment rate (percentage)
SMSA	.70	.74	=1 if live in a standard metropolitan statistical area (SMSA)
LOCLF	588.08	3.56	index of local labor force size
POTEXP	6.69	24.93	years of potential work experience at time (t_0)
SERV	.45	.49	=1 if employed in a service industry
UNION	.11	.11	=1 if member of a union

TABLE A1
Job Training (EJT)

	YOUNG WOMEN				MATURE WOMEN			
	In-Firm		Outside		In-Firm		Outside	
Variable	b	t	b	t	b	t	b	t
INTERCEPT	-0.1660	4.44	0.0551	0.87	-0.1072	3.38	-0.6962	11.34
TIME	-0.0001	0.05	-0.0016	0.50	-0.0010	0.85	-0.0098	4.39
RACE	0.0149	3.21	0.0079	1.01	-0.0067	1.38	-0.0013	0.14
MARSP	-0.0120	2.79	-0.0653	9.01	-0.0059	1.29	-0.0120	1.35
HLTH	-0.0087	1.05	0.0246	1.75	-0.0046	0.80	-0.0250	2.27
DEP	-0.0089	4.91	-0.0054	1.76	-0.0036	3.09	0.0016	0.72
URATE	0.0021	2.18	0.0080	4.86	-0.0006	0.63	0.0063	3.28
NURATE	0.0031	0.72	0.0348	4.82	0.0215	6.28	0.1050	15.85
SMSA	0.0182	3.82	0.0221	2.73	-0.0015	0.27	0.0046	0.42
LOCLF	0.0000	2.67	-0.0000	1.79	0.0026	2.52	0.0014	0.67
EDUC	0.0222	4.19	-0.0361	4.03	0.0014	0.38	-0.0334	4.52
EDUCSQ	-0.0007	3.26	0.0021	5.70	0.0001	0.47	0.0027	8.35
POTEXP	0.0101	6.22	0.0087	3.19	0.0017	1.01	0.0246	7.40
POTEXPSQ	-0.0004	5.14	-0.0007	5.39	-0.0000	1.34	-0.0005	7.90
SERV	-0.0500	11.99	0.0754	10.67	-0.0061	1.45	0.0611	7.45
UNION	0.0336	5.18	0.0054	0.49	-0.0105	1.63	0.0401	3.23
R-Square	0.034		0.055		0.037		0.220	
N	13,233				6,940			

Definitions: EDUCSQ = years of education, squared.
POTEXPSQ = years of potential work experience, squared.

TABLE A2
Separations

	YOUNG WOMEN						MATURE WOMEN					
	All		Intra-LF		Inter-LF		All		Intra-LF		Inter-LF	
Variable	b	t	b	t	b	t	b	t	b	t	b	t
INTERCEP	1.274	16.56	.302	4.41	.972	13.67	.873	10.60	.179	2.92	.693	9.63
TIME	.004	1.07	.004	1.15	.000	.05	.007	2.18	-.003	1.35	.010	3.64
RACE	-.003	.36	-.000	.05	-.003	.34	.016	1.27	-.011	1.10	.027	2.39
MARSP	.090	10.09	-.054	6.87	.144	17.50	.056	4.62	-.017	1.84	.072	6.86
HLTH	.098	5.78	.019	1.26	.079	5.04	.094	6.32	-.002	.18	.096	7.38
DEP	.035	9.36	-.002	.52	.037	10.62	.025	8.26	.006	2.87	.018	7.01
URATE	.004	2.25	-.002	1.25	.007	3.64	.010	4.04	.004	2.11	.006	2.82
NURATE	-.016	1.80	-.010	1.25	-.006	.75	-.030	3.47	.017	2.64	-.047	6.21
SMSA	.016	1.62	.016	1.80	.000	.02	-.000	.03	.004	.36	-.004	.34
LOCLF	-.000	1.00	-.000	2.06	.000	.90	.000	.10	-.001	.63	.002	.65
EDUC	-.058	5.31	.011	1.14	-.069	6.84	-.029	2.94	-.008	1.01	-.022	2.50
EDUCSQ	.001	1.33	-.001	1.42	.001	2.80	-.000	.08	.000	.25	-.000	.31
POTEXP	-.045	13.43	-.015	5.18	-.030	9.54	-.014	3.13	-.005	1.60	-.009	2.22
POTEXPQ SQ	.001	7.08	.000	3.08	.001	4.70	.000	2.11	.000	1.40	.000	1.22
SERV	.127	14.71	.091	11.84	.036	4.54	.088	7.91	.033	4.00	.055	5.64
UNION	-.299	22.33	-.126	10.57	-.173	13.99	-.234	13.47	-.054	4.17	-.180	11.86
R-Square	.1403		.0398		.1026		.0914		.0144		.0866	
N	12,648						7,757					

TABLE A3
Incidence of Unemployment

	YOUNG WOMEN		MATURE WOMEN	
Variable	**b**	**t**	**b**	**t**
INTERCEP	.547	8.31	.265	4.88
TIME	-.018	5.38	.004	1.74
RACE	-.068	8.32	-.022	2.60
MARSP	-.014	1.83	-.019	2.40
HLTH	.056	3.84	.015	1.50
DEP	.019	6.08	.007	3.78
URATE	.011	6.48	.077	4.19
NURATE	.047	6.23	-.017	2.89
SMSA	-.009	1.11	-.009	.87
LOCLF	-.000	3.52	-.001	2.08
EDUC	-.033	3.49	-.000	.06
EDUCSQ	.000	.54	-.001	2.08
POTEXP	-.035	12.38	.001	.33
POTECPSQ	.001	7.94	-.000	.82
SERV	.027	3.66	-.010	1.42
UNION	-.088	7.66	-.026	2.31
R-Square	.0640		.0259	
N	13,233		8,061	

TABLE A4
Unemployment Incidence P(u) and Its Components (2-year Intervals)

	All-Turnover			Intra-Turnover			Inter-Turnover		
	P(u)	P(s)	P(u/s)	P(ua)	P(Sa)	P(u/Sa)	P(ue)	P(Se)	P(u/Se)
NLS Young Women[1] Education: <12 Yrs.	.512	.853	.600	.220	.323	.682	.376	.645	.583
12 Yrs.	.350	.698	.501	.206	.343	.601	.202	.439	.461
13-15 Yrs.	.311	.695	.447	.213	.399	.534	.150	.372	.402
16+ Yrs.	.234	.609	.384	.175	.360	.485	.087	.307	.284
NLS Mature Women[2] Education: <12 Yrs.	.227	.633	.358	.109	.235	.463	.145	.445	.325
12 Yrs.	.130	.502	.258	.075	.191	.391	.065	.336	.194
13-15 Yrs.	.110	.520	.211	.059	.215	.273	.071	.344	.205
16+ Yrs.	.059	.391	.151	.029	.151	.195	.037	.262	.141

Note: [1] Includes only 1968-70, 1969-71, 1970-72, and 1971-73 intervals

[2] Includes only 1967-69 interval

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